5. INVERTER MULTI-SPLIT SYSTEM ROOM AIR-CONDITIONER

(Air cooled cooling only type)

(OUTDOOR UNIT)

SCM68YA

(INDOOR UNIT)

SKM22YA
SKM25YA
SKM40YA

CONTENTS

5.1 GENERAL INFORMATION

5.1.1 Specific features

(1) The long piping makes the location of the inside and units flexible.

- No need for additional charge of refrigerant : 30 m
- Maximum piping length : 40 m

(2) Connectable indoor capacity

Number of connectable units : 1 to 3 units

Total of indoor units (class kW) : 12.0 kW

(3) Indoor units are available with 3 capacities.

3 capacities 22, 25, 40

(4) Inverter (Frequency converter) for multi-steps power control

- The rotational speed of a compressor is changed in step in relation to varying load, to interlock with the indoor and outdoor unit fans controlled to changes in frequency, thus controlling the power.
- Allowing quick cooling operation during start-up period. Constant room temperature by fine-tuned control after the unit has stabilized.

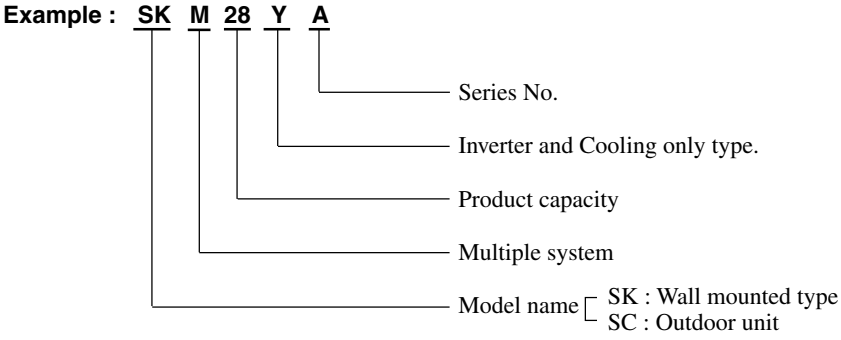
(5) Fuzzy control

Fuzzy control calculates the amount of variation in the difference between the suction air temperature and the setting temperature in compliance with the fuzzy rules in order to control the air capacity and the inverter frequency.

(6) Self diagnosis function

We are constantly trying to do better service to our customers by installing such judges that show abnormality of operation as follows. (See page 169)

5.1.2 How to read the model name



5.2 SELECTION DATA

5.2.1 Specifications

(1) Indoor unit

Models SKM22YA, 25YA, 40YA

Item \ Models				SKM22YA	SKM25YA	SKM40YA
Cooling capacity			W	2200	2500	4000
Noise level	Sound level		dB	Hi : 38 Lo : 29		Hi : 42 Lo : 31
	Power level			Hi : 52 Lo : 43		Hi : 56 Lo : 45
Exterior dimensions Height × Width × Depth			mm	250 × 750 × 178		275 × 790 × 174
Color				Ivory white		
Net weight			kg	7.5		8.0
Air handling equipment Fan type & Q'ty				Tangential fan × 1		
Motor			W	17		18
Air flow (at high)			CMM	7.0		9.5
Air filter, Q'ty				Polypropylene net × 2 (Washable)		
Operation switch				Wireless-Remote controller		
Room temperature control				M.C thermostat		
Pilot lamp				RUN (Green), TIMER (Yellow)		
Safety equipment				Frost protection, Serial error protection Fan motor error protection		
Refrigerant piping	O.D	Liquid line	mm (in)	ϕ 6.35 (1/4″)		
		Gas line		ϕ 9.52 (3/8″)		ϕ 12.7 (1/2″)
	Connecting method			Flare connecting		
	Attached length of piping			Liquid line : 0.4m Gas line : 0.35m		
	Insulation			Necessary (Both Liquid & Gas lines)		
Drain hose				Connectable		
Accessories (including)				Mounting kit		
Optional parts				—		
Outdoor units to be combined				SCM68YA		

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27ºC	19ºC	35ºC	24ºC	ISO-T1, JIS C9612

(2) Capacity indicated is the rated capacity with one unit operating under ISO-T1 standards conditions.

(2) Outdoor unit

Model SCM68YA

Item		Model	SCM68YA
Cooling capacity		W	6800 (1800~7000)
Power source			1 Phase 220/230/240V 50Hz
Power consumption		W	3230 (500~3400)
Running current		A	17.0/16.6/16.1
Noise level	Sound level	dB	50/50/ 51
	Power level		64/64/65
Exterior dimensions Height × Width × Depth		mm	640 × 850 × 290
Color			Stucco white
Net weight		kg	53
Refrigerant equipment Compressor type & Q'ty			RM5516GA4 × 1
Motor		kW	1.5
Starting method			Direct start
Refrigerant control			Capillary tubes + Electric expansion valve + Thermal expansion valve
Refrigerant		kg	R22 1.95 (Pre-charged up to the piping length of 30m)
Refrigerant oil		ℓ	0.6 (BARREL FREEZE 32SAM)
Air handling equipment Fan type & Q'ty			Propeller fan × 1
Motor		W	37
Air flow (at high)		CMM	40
Shock & vibration absorber			Rubber (for compressor)
Safety equipment			Compressor overheat protection, Overcurrent protection Power teransistor overheat protection
Refrigerant piping	Size × Core × Number	mm (in)	Liquid line: ϕ 6.35 (1/4″) × 3
			Gas line: ϕ 9.52 (3/8″) × 2 + ϕ12.7 (1/2″) × 1
	Connecting method		Flare connecting
	Attached length piping		—
	Insulation		Necessary (Both Liquid & Gas lines)
Power source supply			Terminal block (Screw fixing type)
Connection wiring	Size × Core number		1.5 mm² × 4 cores (Including earth cable)
	Connecting method		Terminal block (Screw fixing type)
Accessories (included)			Union : (ϕ 9.52 → ϕ 12.7) × 2, (ϕ 12.7 → ϕ 9.52) × 1 Installation sheet, Manual instruction
Indoor units to be combined			SKM22, 25, 40 type

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling	27ºC	19ºC	35ºC	24ºC	ISO-T1, JIS C9612

(2) The values for capacity and power consumption shown in a range ( ) indicate the minimum and maximum of the range.

(3) If the piping length exceeds 30m, additional charging is required. (20g/m)

(3) Operation data

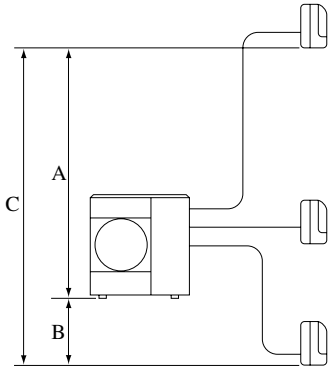
- The combinations of the indoor units is indicated by numbers. They are read as follows.
  (Example) SKM22YA → 22 SKM40YA → 40
- The capacity of the indoor units is shown by rooms. If this exceeds the maximum capacity of the outdoor unit, the demand capacity will be proportionally distributed.
- If units are to be combined, use the table below to make the proper selection.

◆Cooling

Indoor unit combination		Cooling capacity (kW)						Power consumption (W)			Standard current (A)		
		Room Cooling capacity (kW)			Total capacity (kW)			Min.	Standard	Max.	220V	230V	240V
		A room	B room	C room	Min.	Standard	Max.						
1 room	22	2.2			1.8	2.2	2.5	500	600	700	3.2	3.1	3.0
	25	2.5			1.8	2.5	2.8	500	750	870	3.9	3.9	3.7
	40	4.0			2.6	4.0	4.5	1,050	1,500	1,750	7.9	7.7	7.5
2 room	22+22	2.2	2.2		2.8	4.4	5.0	1,200	1,700	2,010	8.9	8.7	8.5
	22+25	2.2	2.5		2.8	4.7	5.3	1,200	1,850	2,170	9.7	9.5	9.2
	22+40	2.1	3.9		2.8	6.0	6.2	1,200	2,600	2,810	13.7	13.4	13.0
	25+25	2.5	2.5		2.8	5.0	5.6	1,200	2,000	2,330	10.5	10.3	10.0
	25+40	2.3	3.7		2.8	6.0	6.2	1,200	2,710	2,930	14.3	13.9	13.5
	40+40	3.2	3.2		2.8	6.4	6.6	1,200	2,960	3,200	15.6	15.2	14.8
3 room	22+22+22	2.03	2.03	2.03	4.0	6.1	6.3	1,650	2,730	2,950	14.4	14.0	13.6
	22+22+25	1.9	1.9	2.3	4.0	6.1	6.3	1,650	2,780	3,010	14.6	14.3	13.9
	22+22+40	1.7	1.7	3.1	4.0	6.5	6.7	1,650	3,030	3,280	15.9	15.6	15.1
	22+25+25	1.8	2.2	2.2	4.0	6.2	6.4	1,650	2,830	3,060	14.9	14.5	14.1
	22+25+40	1.7	1.9	3.0	4.0	6.6	6.8	1,650	3,080	3,330	16.2	15.8	15.4
	22+40+40	1.5	2.6	2.6	4.0	6.7	6.9	1,650	3,170	3,380	16.7	16.3	15.8
	25+25+25	2.1	2.1	2.1	4.0	6.3	6.5	1,650	2,880	3,110	15.2	14.8	14.4
	25+25+40	1.9	1.9	2.9	4.0	6.7	6.9	1,650	3,130	3,380	16.5	16.1	15.6
	25+40+40	1.5	2.6	2.6	4.0	6.7	6.9	1,650	3,170	3,380	16.7	16.3	15.8
	40+40+40	2.27	2.27	2.27	4.0	6.8	7.0	1,650	3,230	3,400	17.0	16.6	16.1

5.2.2 Range of usage & limitations

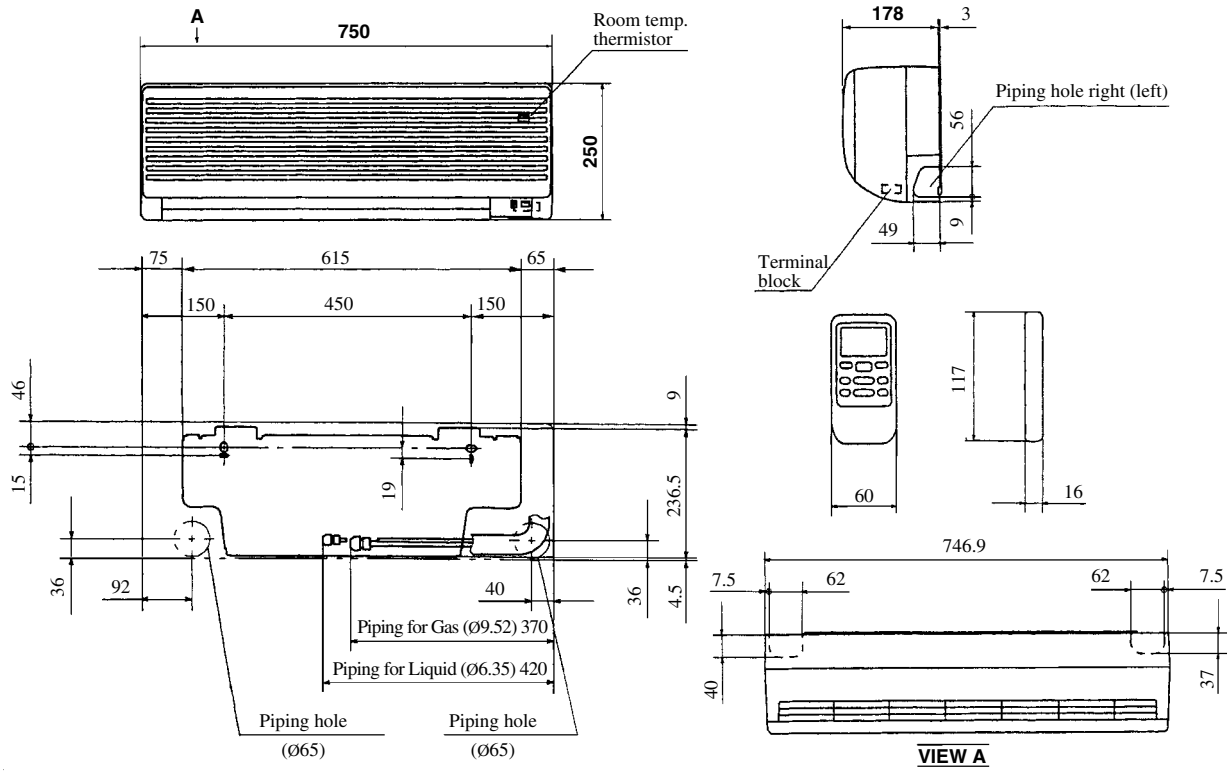
Item \ Model		SCM68YA
Indoor intake air temperature (Upper, lower limits)		Refer to the selection chart.
Outdoor air temperature (Upper, lower limits)		
Indoor units that can be used in combination	Number of connected units	1 to 3 units
	Total of indoor Units (class kW)	12.0kW
Total length for all rooms		Max. 40m
Length for one indoor unit		Max. 25m
Difference in height between indoor and outdoor units	When above outdoor unit (B)	Max. 10m
	When below outdoor unit (A)	Max. 15m
Difference in height between indoor units (C)		Max. 25m
Compressor stop/start frequency	1 cycle time	6 min or more (from stop to stop or from start to start)
	Stop time	3 min or more
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage
	Voltage drop during start	Within ±15% of rated voltage
	Interval unbalance	Within ± 3% of rated voltage



5.2.3 Exterior dimensions

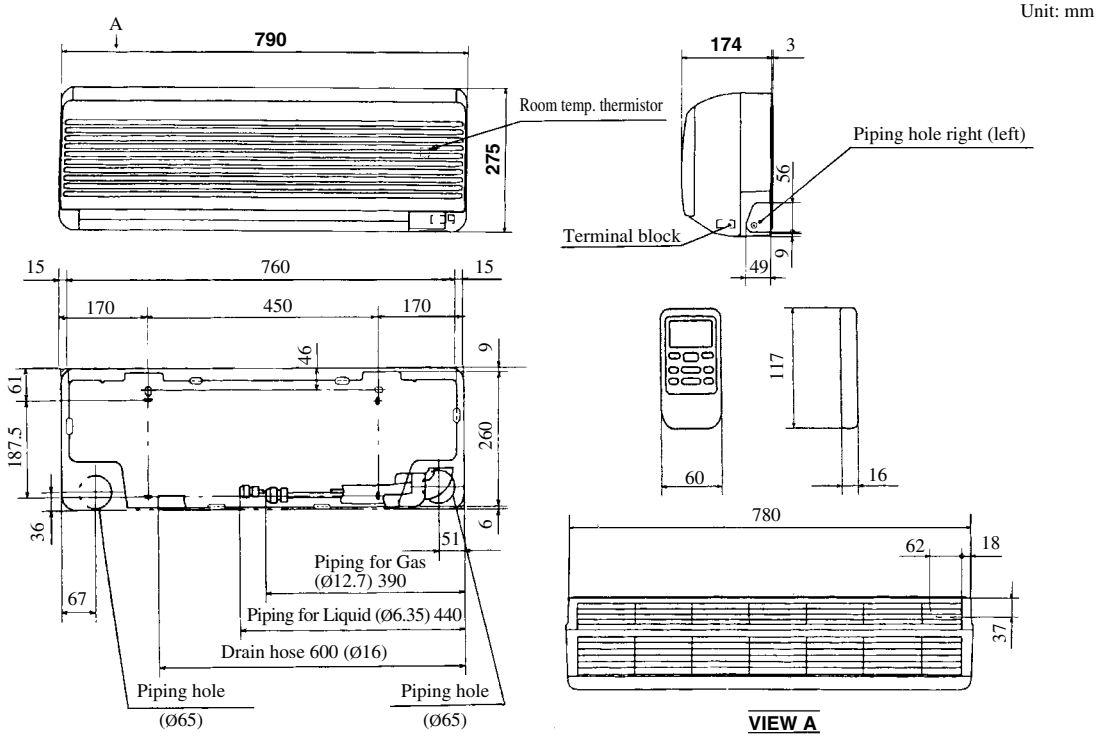
(1) Indoor unit

Models SKM22YA, 25YA

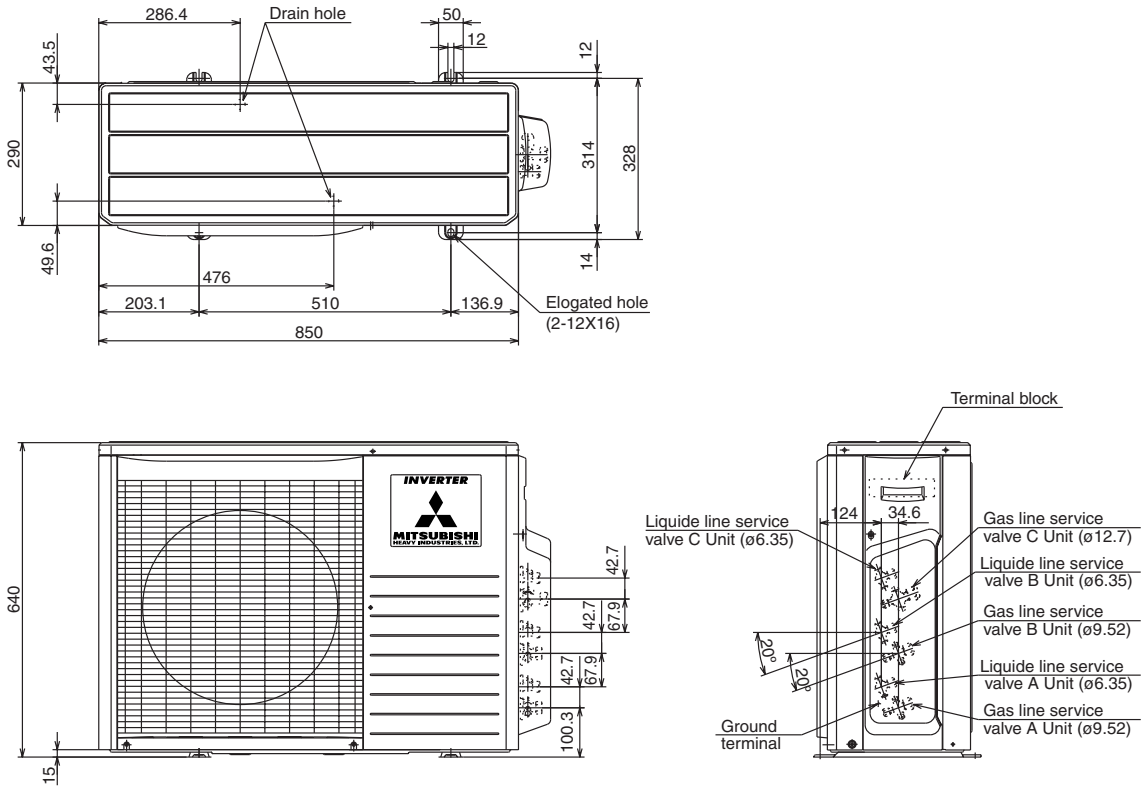


Model SKM40YA

Unit: mm

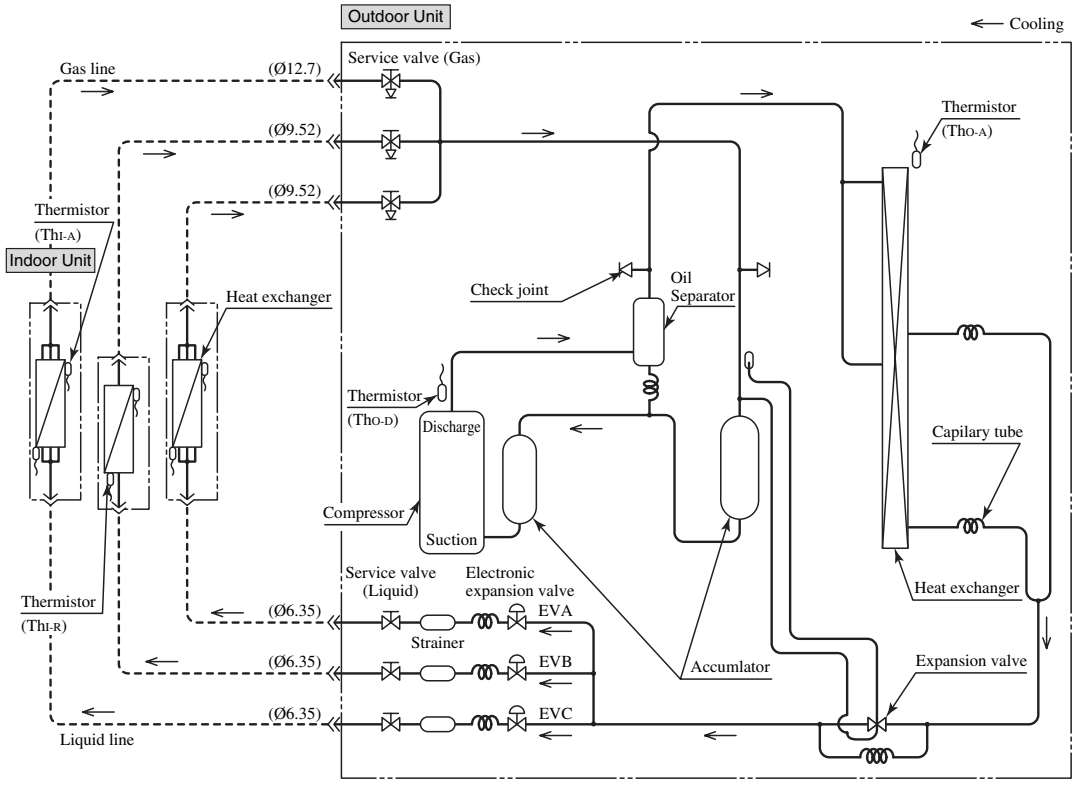


(2) Outdoor unit
Model SCM68YA



5.2.4 Piping system

Model SCM68YA

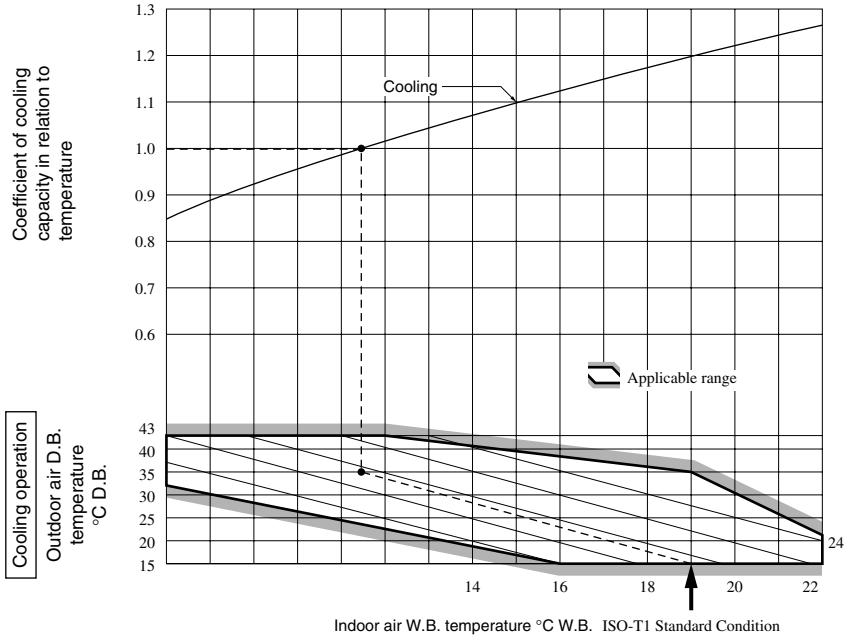


5.2.5 Selection chart

Correct the cooling capacity in accordance with the conditions as follows. The net cooling capacity can be obtained in the following way.

Net capacity = Capacity shown on specification × Correction factors as follows.

(1) Coefficient of cooling capacity in relation to temperatures



(2) Correction of cooling capacity in relation to one way length of refrigerant piping

It is necessary to correct the cooling capacity in relation to the one way piping length between the indoor and outdoor units.

Piping length [m]	7	10	15	20	25
Cooling	1.0	0.99	0.975	0.965	0.95

5.3 ELECTRICAL DATA

Meaning of marks

• Outdoor Unit

Symbol	Parts name	Symbol	Parts name
CM	Compressor motor	NF	Noise filter
C	Capacitor	EEVA ~ C	Electric expansion valve
FM_O	Fan motor	Tho-A	Thermistor (outdoor air temp.)
Re	Reactor	Tho-D	Thermistor (discharge temp.)
SA	Serge absorber	LED5	Warning lamp (Red)
CT	Current sensor	LED1 ~ 3	Serial signal lamp (Green)
DS	Diode stack	$52X_{5-1}$	Auxiliary relay

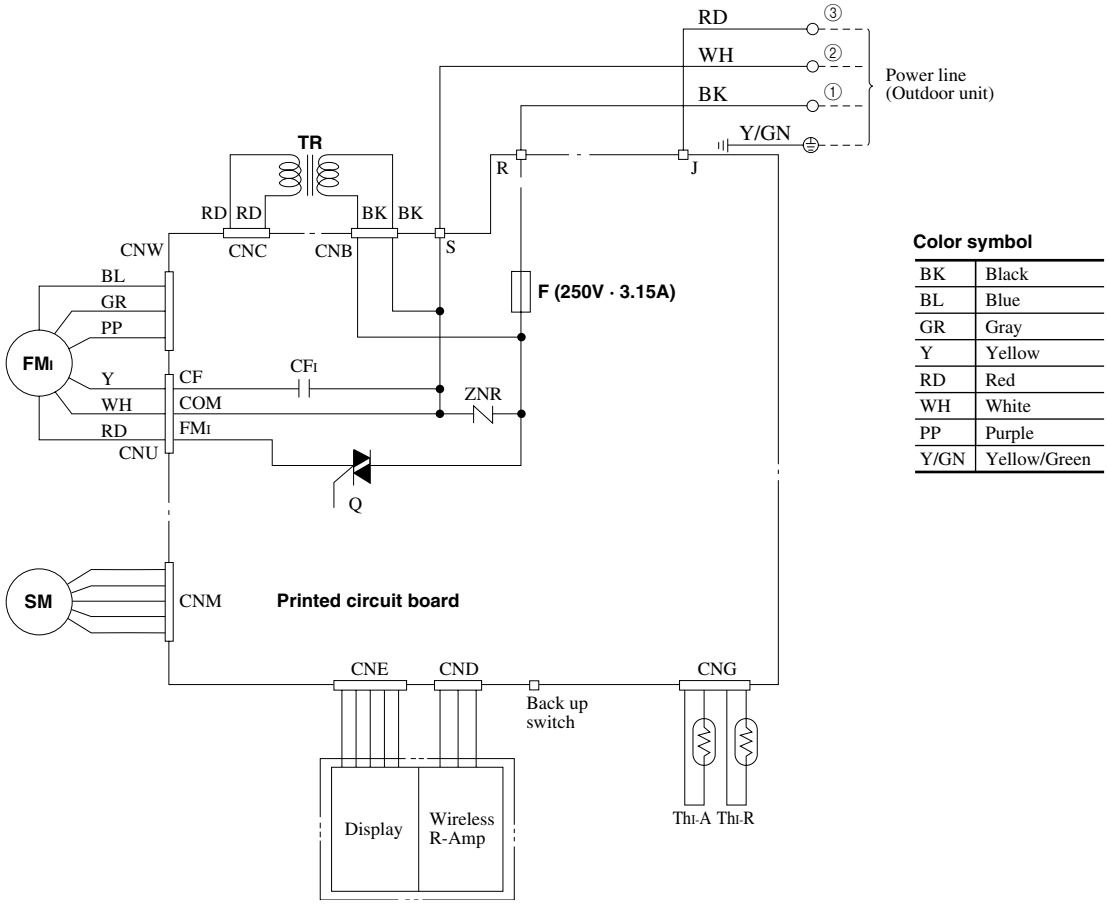
• Indoor Unit

Symbol	Parts name	Symbol	Parts name
FM_I	Fan motor	Q	Fan motor control triac
CF_I	Capacitor (for FM_I)	F	Fuse
SM	Flap motor	Th_I-A	Thermistor (room temp.)
Tr	Transformer	Th_I-R	Thermistor (indoor H.X temp.)
ZNR	Varistor		

5.3.1 Electrical wiring

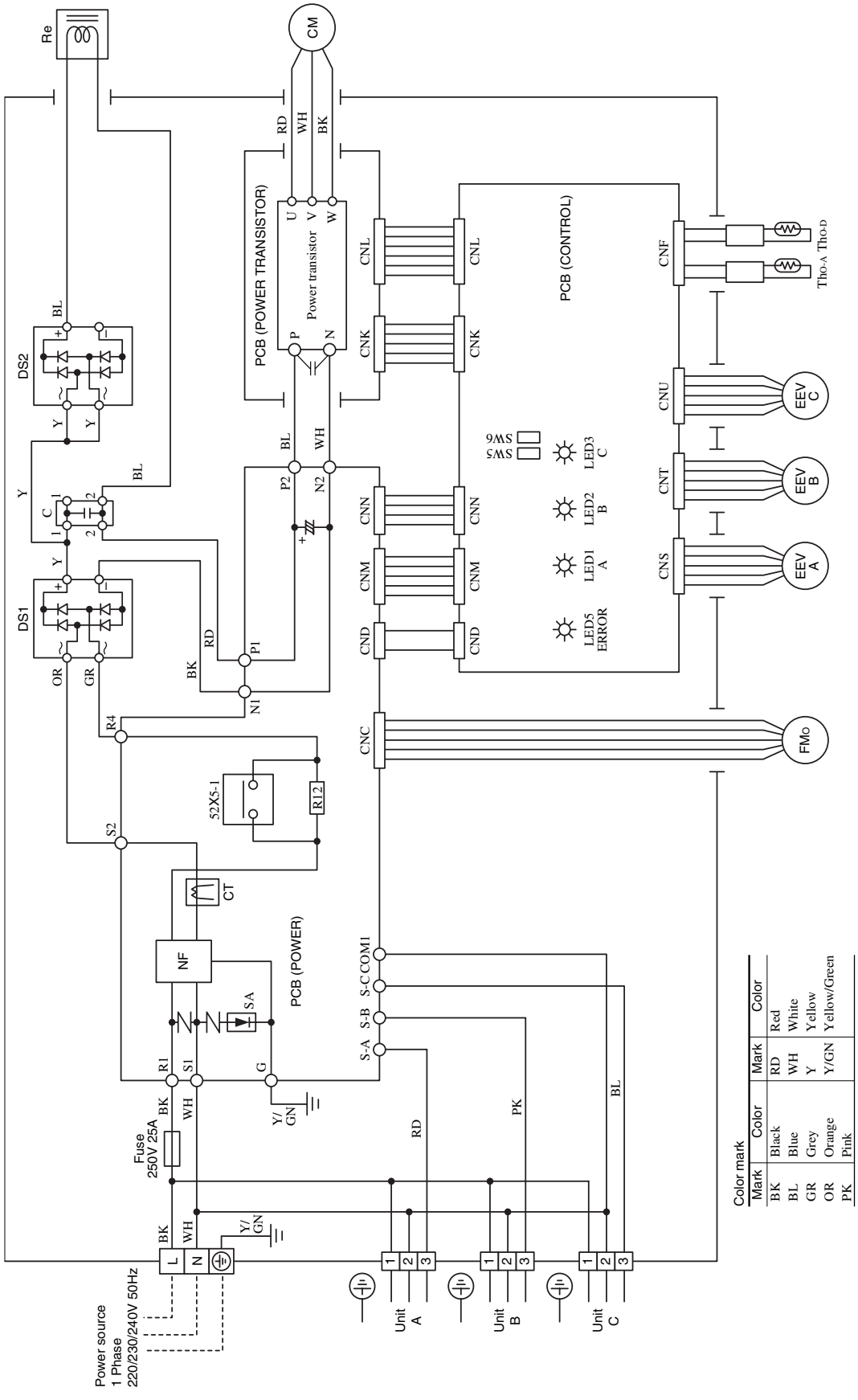
(1) Indoor unit

Models SKM22YA, 25YA, 40YA



(2) Outdoor unit

Model SCM68YA



5.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

Except for function relating to heating, same at the for SKM heat pump models. See Page 135.

5.5 APPLICATION DATA

The application data for the cooling only models are similar to those for the heat pump models. See Page 148.

5.6 MAINTENANCE DATA

Some at the cooling/heating equipment SKM heat pump models. See Page 168.

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